

# TECHNICAL INFORMATION

## LIME SAND MORTARS

### Product Data Sheet No. 120/01

#### INTRODUCTION

Tarmac Lime Sand Mortars are factory produced lime:sand mortars for use in bricklaying, rendering, plastering or paving applications. Lime:sand mortars are not intended to be used without cement except in some paving applications. The mixes must therefore be gauged and mixed with the appropriate type and quality of cement before use.

Lime Sand Mortars are available from plants situated throughout mainland United Kingdom and are available in bulk or bagged form.

Masonry mortars are available in coloured form, in which case controlled amounts of pigments are added and these are carefully selected and guaranteed by the pigment manufacturers against fading. Tarmac XL mortars are available for cases where lime is not required.

Tarmac Lime Sand Mortars conform to and are tested using the methods in BS 4551. LSM mortars should be used in accordance with the recommendations in the Eurocode 6 BS EN 1996. BS EN 13914 and BS 8481

Where LSM or XL mortars are required in coloured form, the pigments used by Tarmac not only conform to BS EN 12878, but also consist exclusively of synthetic iron oxides which are guaranteed against fading by the manufacturers. Carbon black is not included in any of the pigments used by Tarmac.

#### DESCRIPTION

#### COMPOSITION AND MANUFACTURE

Tarmac Lime Sand Mortar are factory produced using quality lime and fine aggregate (sand) of appropriate grading, normally with the inclusion of an air entraining admixture to improve working properties and durability.

For more details contact:  
 03701 116 116 mortar@tarmacbp.co.uk

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Factory mixing of pigment into LSM coloured mortars ensures controlled and even dispersion which would be very difficult to achieve with site additions.

Lime Sand Mortars are supplied in bulk tippers, skips, bulk bags and standard bags to any mix specification ready for gauging on site with cement as appropriate.

#### DENSITY

Typical test results	Density kg/m <sup>2</sup>
Without Air Entrainment	1850 – 2000
With Air Entrainment	1700 – 1850

#### PERFORMANCE

We would recommend you consider the following strength designations when specifying mortar mixes.

#### STRENGTH

Results based on mixes correctly gauged with cement. Prisms made cured and tested in accordance with the requirements of BS EN 1015.

BS EN 998-2 Mortar Class	Traditional Mortar Designation Masonry Mortar
M12	i
M6	ii
M4	iii
M2	iv

The rendering mortar standard BS EN 998-1 uses a different strength classification. Specifiers should select a suitable mortar for the particular application.

The information given in this technical data sheet is based on our current knowledge and is intended to provide general notes on our products and their uses. Tarmac endeavour to ensure that the information given is accurate, but accept no liability for its use or its suitability for particular application because of the product being used by the third party without our supervision. Any existing intellectual property right must be observed.

BS EN 998-1 Mortar Class	CS I	CS ii	CS iii	CS iv
Ranges of Strength Classes	>6.0	3.5 – 7.5	1.5 – 5.0	0.4 – 2.5
Rendering Mortar N/mm <sup>2</sup>				

#### Notes

1. The designation iii mortar form Tarmac meets the requirements of a General Purpose Mortar as defined in BRE Digest 362.
2. Although the compressive strength of mortar is used for quality control, it is considered that only the testing of masonry will indicate the strength likely to be achieved.
3. The presence of pigment in Tarmac products does not adversely affect the strength of masonry.

#### FIRE PROTECTION

Tarmac Ready-to-use mortar contains less than 1.0% organic material and is classified in accordance with BS EN 13501-1 as Class A1 without testing (Commission Directive 96/603/EC).

#### THERMAL & ACOUSTIC

Refer to Tarmac General Mortar Mix Design Manual.

#### EFFECT OF FREEZE THAW DAMAGE

In cold conditions, adequate precautions must be taken against frost, see Tarmac Site Guide No. 6. No anti-freeze chemicals or accelerating admixtures should be added to the delivered mortar.

#### COMPATIBILITY

Tarmac mortars are compatible with all normal building materials. However, any cement based material will be alkaline and may attack aluminium or zinc when wet.

#### DURABILITY

No problems should occur if the correct mortar has been specified and accurately gauged with cement on site. Pigments are carefully chosen and guaranteed against fading by the pigment manufacturers.

#### HEALTH & SAFETY

There is a real danger of contact Dermatitis or serious burns if skin comes into contact with wet cement mixes such as fresh concrete, mortar or screed. Wear suitable protective clothing and eye protection. Where skin contact occurs either directly

or through saturated clothing wash immediately with soap and water. For eye contact, immediately wash out eyes thoroughly with clean water. If swallowed wash out mouth and drink plenty of water. For further information refer to Tarmac Safety Data Sheet Lime Base Mortars.

#### APPLICATIONS

##### USES

Tarmac LSM mortars may be used in any masonry, rendering or plastering application where the good consistence, durability and other benefits of a lime based mortar are required.

##### ERGONOMICS

The figures given below are intended as a guide only and may vary depending on unit size, depth of frog, perforations, wastage and other factors.

##### BRICKLAYING

One tonne of LSM lime:sand mortar when gauged with cement on site will be sufficient to lay approximately 1,000 bricks. (The actual figure may range between 850 and 1,200 bricks). For modular size bricks this can reduce to 700/750 bricks per tonne.

1m<sup>2</sup> brickwork requires 57 imperial size bricks

1m<sup>2</sup> brickwork requires 60 metric size bricks

1m<sup>2</sup> brickwork requires 50 – size 200 mm x 100 mm x 100 mm modular bricks

1m<sup>2</sup> brickwork requires 33 – size 300 mm x 100 mm x 100 mm modular bricks

##### Block laying

One tonne of LSM lime:sand mortar when gauged with the correct amount of cement on site will be sufficient to lay approximately 600 blocks nominal size 450 mm x 225 mm x 100 mm. This is equivalent to about 60m<sup>2</sup> of single skin blockwork.

## PLASTERING & RENDERING

When applied to a wall the mortar coverage will depend on a number of factors such as depth of raked joints, alignment of wall and wastage. As a result only approximate coverage's are quoted.

Volume yield – 1 tonne when mixed with the correct quantity of cement and water on site will yield 0.65m<sup>3</sup> to 0.75 m<sup>3</sup>.

Over brickwork having 3 mm raked joint, the following theoretical coverage's apply. The actual coverage will depend on the amount of wastage.

Thickness (mm)	Coverage Area m <sup>2</sup> /tonne (approximately)
5	100 – 120
10	54 – 63
13	42 – 49
18	31 – 36

## PAVING / FAGGING

Volume yield – when correctly compacted, 1 tonne will yield 0.50m<sup>3</sup> to 0.53 m<sup>3</sup>.

Thickness (mm)	Coverage Area m <sup>2</sup> /tonne (approximately)
50	10
100	5

## SPECIFICATION OF MORTAR

Mortars should conform to the appropriate part of BS EN 998 for Lime:sand mortars.

When mortar is specified the following factors should be considered and details stated, as appropriate.

1. Mortar strength class (Designation or class), e.g. iii.
2. Fine aggregate (sand) specification, e.g. BS EN 13139.
3. Colour reference, if applicable, e.g. Y3.
4. Method of mixing, e.g. Factory site gauged.
5. Quality requirements, e.g. Third party accredited producer.
6. Type of cement.
7. Mortar admixtures, normally to BS EN 934.

Note: Tarmac – Y reference coloured mortars contain only 100% synthetic iron oxides to ensure durability and retention of colour. Other coloured mortars may contain inferior carbon based pigments which are not recommended due to lack of stability and durability.

## RECOMMENDED MORTAR MIXES

For Durable Clay Brickwork

\* Check with Brick Manufacturers as to suitability of these bricks in exposed conditions.

Brick Strength	Approximate Mean Water Absorption (%)	Recommended Mortar Mix		
		Normal Exposure	Severe Exposure	Parapets, Copings, Sill etc. *
Up to 50	10+	M4	M6	M12
50 – 75	5 – 10	M4	M6, M12	M12
Over 75	0 - 5	M4, M6	M6, M12	M12

\* Tarmac SB Admixture can also be used in site gauged mortars in these situations.

Note: The above recommendations may be modified for structural brickwork.

For further information see BS EN 1996.

## CONSTRUCTION / SITE WORK

### DELIVERY AND STORAGE

Tarmac Lime Sand Mortars should be tipped on to a clean banker board with a sealed base and sheeted when not in use. Sheeting is particularly important in the case of coloured mortar to protect against rain and weathering. In warm weather it would be advisable to protect the surface of the mortar and keep it damp, to help prevent the formation of lumps through rapid drying and carbonation. Do not tip new deliveries on to the remains of the previous load.

For convenience, Lime Sand Mortars are also available in skips or bulk bags which should also be covered to protect the material in storage. For smaller jobs, or when material is to be stored for longer periods, Lime Sand Mortars are available in standard size plastic bags at some of the supplying factories. Please contact your local sales office.

## CEMENT GAUGING

It is strongly advised that the same brand, type, strength and source of cement is used throughout the contract and that site gauging is carried out accurately by weight or by volume using gauge boxes.

Recommended Ratios Cement:Lime:Sand	Order Mix	Mix Cement:Sand
1:1/4:3	1:12	1:3
1:12:4/12	1:9	1:4 1/2
1:1:6	1:6	1:6
1:2:9	1:4 1/2	1:9

## GAUGING WATER & TOOLING

Use clean water and do not introduce admixtures without checking with the Tarmac technical department. Uniformity of colour is important and therefore care should be taken to ensure that the mortar is mixed to a regular consistency. This is best achieved by machine mixing.

Variations in the technique or the time at which the mortar joint is tooled can also have an effect on the final colour.

## MASONRY

Stacked bricks and blocks should be protected and kept dry. Do not use saturated bricks, especially with coloured mortar, as this can cause disfiguration of the building, delayed setting of the mortar and in winter, attack on the masonry by frost.

In windy conditions partially constructed brickwork should be propped.

In hot weather it may be necessary to slightly wet certain types of porous bricks. Blocks to control suction (see Site Guide 7).

Bed and point brickwork in one operation to obtain maximum durability of the joints. The top course of new work should be protected against the weather by covering at all items during construction. This is even more important with cavity walls or where perforated bricks are used.

Where cavities are completely filled to improve thermal insulation a greater onus is placed on workmanship and care should be taken to ensure that all bed and cross joints are properly filled to prevent rain penetration. Careful consideration should be given to the design and specification of brickwork capping and parapets if problems are to be avoided. Mortar strengths of class M12 or M6 should be used depending on the strength and type of brick used and all mortar joints must be fully filled to

eliminate voids in brickwork. It is recommended that if perforated bricks are used in capping the perforations should also be fully filled for the same reason. Flush, tooled mortar joints are recommended for horizontal or sloping surfaces to assist in shedding water from the masonry.

The Brick Development Association should be consulted regarding choice of suitable bricks and recommended minimum number of courses above the damp proof course where cappings are used. Since cappings and parapet brickwork are subjected to greater extremes of moisture and thermal movement, serious consideration should be given to increasing the frequency of the movement joints in these areas.

## PLASTERING

Plaster should never be applied to walls saturated with water. Walls should be clean and all dust and efflorescence brushed off before plastering is started.

Type of Background	Thickness (mm) max
SOLID	
Two coat work excluding concrete	12
Two coat work on bonded concrete	10
Three coat work excluding concrete	19
METAL LATHING	
Total plaster thickness from face of lathing	13

Unless greater thicknesses are required for the purpose of fire protection, or acoustic insulation, following total thicknesses should be used as a guide.

## EXTERNAL RENDERING

The undercoat, 10 – 16 mm thick, should be horizontally scratched and allowed to dry out thoroughly before applying the second coat, thus allowing any potential shrinkage to occur. If possible allow at least 2 days in summer and a week in cold or wet weather. When the undercoat has dried thoroughly the surface may need damping before applying the finish. The total thickness of rendering over metal lathing should be at least 16 mm.

For coloured renderings, only the finish coat need contain pigment (except in the case of wet dash or Tyrolean finishes).

The thickness of a normal final coat should be

consistent and should not exceed 10 mm.

Smooth trowelled finishes are not recommended as they may suffer crazing and colour variation.

## NOTES ON RENDERING/PLASTERING

1. Brickwork – it is desirable to have the joints raked out and this becomes essential where the bricks are of a dense impermeable type in order to achieve a good bond.
2. Old masonry – (whether brick, block or poured concrete) should be thoroughly wire brushed and washed down. In the case of concrete it may be necessary to provide a mechanical key by bush hammering and/or a bonding coat of cement:sand spatterdash.
3. Moderately weak blocks and porous materials – such as lightweight concrete blocks or bricks of low strength, should generally be rendered with mortar having a high water retentivity and weaker strength than the background.
4. No-fines concrete – a thin coat should be applied to blind and level the surface followed by the floating coat.
5. Metal lathing – should be rendered with a lime based mortar in order to reduce the risk of corrosion.
6. It is important to note that smooth woodfloat or sponged finishes are very susceptible to colour variation due to various factors under site control. These include the effect of background suction, moisture content of the background, degree of protection of mortar before use, the amount of floating./sponging applied and the surface and ambient conditions.

A series of Site Guides are available providing information on the use of Tarmac mortars in practice.

## MAINTENANCE

### BRICKWORK

Prevention is better than cure, but any stains appearing on brickwork can be removed by the application of various proprietary cleaning agents.

### RENDERING

Rendered finishes may be cleaned by washing down with water applied through a fine jet at mains pressure. All cracks and damaged areas should be repaired before cleaning.

## TECHNICAL SUPPORT

Tarmac provides a comprehensive sales and technical advisory service to specifiers and customers.

A quality system has been implemented throughout the company since 1975 and quality procedures are in conformity with BS EN ISO 9001:2000. All Tarmac factories hold third party certification from the British Standards Institution. Details of the certification status of individual factories may be obtained from our technical helpdesk.

## PRICES AND CONDITIONS OF SALE

Prices vary according to mix design, quantity and delivery location. For specific quotations contact your nearest Tarmac Office.

All quotations given, orders placed and materials supplied are subject to the Conditions of Sale available via download from the Tarmac website [www.tarmac.com](http://www.tarmac.com) or upon request from your nearest Tarmac Building Products Area Office

## AVAILABILITY

Tarmac LSM mortars are available direct from factories located strategically throughout mainland United Kingdom. For a list of mortar factories contact your local Tarmac Area Office.

When ordering please state the following:

1. Mix composition and purpose of use (in the case of LSM mortars the inclusion or exclusion of air-entrainment should be considered – normally recommended).
2. Mortar colour and code number (if applicable).
3. Date and time of delivery – 48 hours should normally be allowed for delivery.

## DELIVERY TO SITE

Type of Mortar:

**LSM natural and coloured**

**XL (without lime)**

**LSM Paving/flagging**

Bulk loads in tipper trucks generally of 10 – 20 tonnes capacity. Also in skips where available, and in bulk bags.

**Skips and bags reduce wastage and prevent contamination.**

## ACCESSORIES

Tarmac SB Admixture

Available in 5 and 25 litre plastic screw-top containers and 200kg drums.

REFERENCES*	
British Standards Institute	
BS EN 197:Part 1: 2011	Cement-Part 1: Compositions, specification and conformity criteria for common cements.
BS EN 934: Part 3: 2009 +A1:2012	Admixtures for concrete, mortar and grout. Admixtures for masonry mortars. Definitions, requirements, conformity and marking and labelling
BS EN 13501: 1: 2007 +A1:2009	Fire classification of construction products and building elements. Part 1: Classification using test data from fire reaction tests
BS EN 459: Part 1 : 2015	Building lime: Definitions, specification and conformity criteria.
BS EN 12878 : 2014	Pigments for colouring of building materials based on cement and/or lime specifications and methods of test.
BS EN 13139 : 2002	Aggregates for mortar.
PD 6682-3 : 2003	Aggregates-Part 3: Aggregates for mortar – Guidance on the use of BS EN 13139
BS 4551 : 2005 +A2:2013	Mortar – Methods of test for mortar – Chemical analysis and physical testing
BS EN 13914-1:2005	Design, preparation and application of external rendering and internal plastering – part 1, external rendering
BS EN 13914-2:2005	Design, preparation and application of external rendering and internal plastering – part 2, design consideration and essential principals for internal plastering
BS 8481 : 2006	Design, preparation and application of internal gypsum, cement, cement and lime, plastering systems. Specification
BS EN 1996-1-1:2005+A1:2012	Eurocode 6. Design of masonry structures. General rules for reinforced and unreinforced masonry structures
BS EN 1996-1-2:2005	Eurocode 6. Design of masonry structures. General rules. Structural fire design
BS EN 1996-2-2006	Eurocode 6. Design of masonry structures. Design considerations, selection of materials and execution of masonry
BS EN 1996-3-2006	Eurocode 6. Design of masonry structures. Simplified calculation methods for unreinforced masonry structures
NA to BS EN 1996-1-1:2005+A1:2012	UK National Annex to Eurocode 6. Designs in masonry structures. General rules for reinforced and unreinforced masonry structures
NA to BS EN 1996-1-2:2005	UK National Annex to Eurocode 6. Design of masonry structures. General rules. Structural fire design
NA to BS EN 1996-2-2006	UK National Annex to Eurocode 6 Design of masonry structures. Design considerations, selection of materials and execution of masonry
NA to BS EN 1996-3-2006	UK National Annex to Eurocode 6. Design of masonry structures. Simplified calculation methods for unreinforced masonry structures
BS EN 998:2010	Specification for mortar for masonry

BS EN 998 Part 1:2010	Rendering and plastering mortar
BS EN 998 Part 2:2010	Masonry mortar
PD 6678:2005	Guide to the specification of masonry mortar
BS EN 1015	Methods of test for mortar for masonry (A multi-part Standard)
Building Research Establishment*	
Digest 362	Building Mortar
Tarmac*	
Tarmac Safety Data Sheet	
Mortar Product Data Sheet No. 100/01	Tarmac Ready to Use Mortars
Site Guide No. 1	Tarmac LSM Mortars
Site Guide No. 4	Tarmac SB Admixture
Site Guide No. 6	Winter working recommendations for mortar.
Site Guide No. 7	Summer working recommendations for mortar
Tarmac General Mortar and Mix Design Manual	

\*Current version applicable to all references